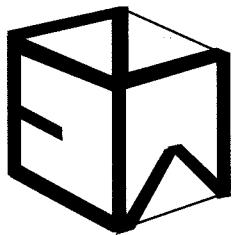


Outline of Tasks and Costs for Obtaining a Beneficial Use Permit Proposed Program Set Forth in HB 831

prepared by



NICKLIN

EARTH & WATER, INC.

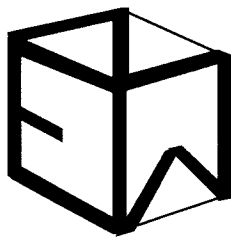
for

Montana Association of Realtors

March 22, 2007

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for
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Existing Program - No Mitigation/No Aquifer Recharge

1. Consulting Services

a. Planning, investigation and testing

- i. Meeting with clients and planning to address client water management goals.
- ii. Evaluate hydrogeologic setting (reviewing geology maps, existing ground-water information etc.).
- iii. Examining other potential factors including (but not necessarily limited to):
 - (1) Nearby streams for potential hydraulic connection.
 - (2) Nearby users of ground water.
 - (3) Siting the well locations (the minimum number of wells is typically two wells as one will be needed as an observation well).
- iv. Field services
 - (1) Logging wells/well construction over-sight
 - (2) Surveying wells for location and other relevant features
 - (3) Conducting pumping test(s) as appropriate. Tests must be conducted in accordance with DNRC rules. Most tests now require the following:
 - (a) Forty-eight (48) hours of data collection preceding a pumping test.
 - (b) Conduct pumping step-test (optional but advisable).
 - (c) Conduct 72 hour pumping test in well.
 - (d) Restart test if necessary (note that generator failures, instrumentation failures, etc., often occur).
 - (e) Measure water level responses in constructed wells and in other nearby wells as appropriate. If a nearby stream is present, consideration must be given to collect data in that stream too. Water levels are measured using pressure transducer instrumentation. Pumping flow rates be measured by flow meters.

- b. If public water supply wells are involved, it will be necessary to complete a preliminary design report on well construction and a PWS-6 or source water protection plan for Montana Department of Environmental Quality (DEQ). Drilling cannot commence until DEQ approves the wells for drilling and testing.

- c. Data synthesis and evaluation.
 - d. Completion of report. Includes completing either an analytical model or a numerical simulation model.
 - e. Completion of Beneficial Use Permit application. Must demonstrate that water is both physically and legally available. Must address potential for adverse impacts to nearby users and potential impacts to nearby streams. This requires obtaining data from sources, analytical simulations and potentially modeling simulations.
 - f. Typical consulting fee costs will range from about \$ 20,000 for a small project to well over \$ 50,000 for a large multi-well, complex project. For a multi-phase project, fees will be higher. See Table 1.
 - g. If the project is contested, costs will increase in accordance with the nature of the objections.
2. Installation of wells and pumping test assistance by driller. These costs will vary dramatically based upon the geologic conditions.
- a. Generally, a minimum of two wells is necessary. One of these wells may be a lower cost well purely installed for monitoring purposes. If large public water supply wells or irrigation wells are involved, construction costs generally range from as low as \$ 15,000 to nearly \$ 200,000 each. The lower costs generally relate to wells placed in shallower strata such as alluvium. The higher costs relate to deeper wells placed in complex strata, or for very large/high capacity water supply wells. The costs at this stage are for the drilling and testing. It does not include costs that will accrue later for final design, pump installation and hook-up to power and pumping house infrastructure, etc..
 - b. Drillers will also be employed to conduct the necessary pumping tests to determine the water-bearing capacity of the strata. Equipment necessary will include:
 - i. Generator (large)
 - ii. Pump(s)
 - iii. Drillers will provide labor as necessary to assist in the following tests:

- (1) Step test
 - (2) 72-hour pumping test
 - (3) 72-hour recovery (note the pump remains in the well until the recovery data are collected).
 - c. Costs for the pumping test equipment rental and services typically ranges from \$ 7,500 to \$ 15,000 (72 hour pumping test). Again, this cost depends upon the specific project.
 - d. Total overall driller typical cost range from \$ 22,500 (simple project) to \$ 200,000 (more complex project).
3. At this stage, there is no guarantee that the beneficial use permit will be granted as this must be resolved through the permitting and potential contested hearing process.
4. For a project that is not contested, the permitting time frame will take approximately six months to a year. Much longer delays, up to several years may occur, if the project is contested. Most projects in closed basins are contested.
5. The costs associated with contested hearings include the following:
 - a. Legal fees
 - b. Additional consulting fees
 - c. Time value of an investment made with no return.
6. Again, there is no guarantee that the beneficial use permit will be granted. Even if the permit is granted, there may be appeals, lawsuits, etc. that occur.

**Program Set Forth in HB 831 - Projected Costs - No Mitigation/No Aquifer
Recharge Required**

7. Evaluation/Assuming no mitigation/no aquifer recharge required. This evaluation is the same as the existing program with the caveat that HB 831 will require the following additional items in the reporting process (per Section 16):
 - a. Ground-water simulation Model. The additional estimated cost for completing a simulation model will vary depending upon the complexity of the site conditions. The added cost is anticipated to range as low as \$ 1,000 if employing a simple analytical model to over \$ 20,000 if employing a more complex three-dimensional ground-water model such as MODFLOW.
 - b. Water quality assessment and report. The estimated additional costs for completing a water quality assessment report again, will depend upon the local hydrogeologic/surface water setting and the amount of water quality data that must be collected. This will depend also on the scale of the project(s) proposed. It is not unreasonable to assume that the costs for completing this effort will range from as low as \$ 2,000 for simple situations to more than \$ 10,000 for more complex settings.

**Program Set Forth in HB 831 - Projected Costs - Mitigation or Aquifer Recharge
Ultimately Required**

8. Evaluation/Assuming Mitigation/Aquifer Recharge Required

- a. The costs for consulting services will increase for completing either a mitigation or aquifer recharge program. The magnitude of this increase will be generally proportional to the following:
 - i. Nature of the required mitigation/aquifer recharge program. There are two fundamental options available and they are:
 - (1) Leave surface water flows in stream (most cost effective and practical) [mitigation as defined in HB 831].
 - (2) Conduct an aquifer recharge program.
 - ii. Leaving flow in the stream is more cost effective. However, communications with FWP legal staff indicate that this is not always a preferred option.
 - iii. Mitigation would involve using an existing surface water right to supply a volume of flow that would offset the amount of water that is consumptively used. The following are some limitations or issues that must be addressed:
 - (a) It is likely that the historic period of use was associated with irrigation (typically only have historic use during the irrigation seasons, say from May 1 through September 30).
 - (b) It must be a senior water right.
 - (c) Wintertime depletions, if they are deemed a concern, cannot be addressed by leaving water in the stream.
 - (d) The applicant may not have an existing surface water right to use for surface water mitigation purposes. If not, the project may need to be abandoned or an existing water right will need to be acquired. That right must be able to address the affected reach.
 - (e) Surface-water rights may be not even be available in areas without agriculture.
 - (f) Water rights would need to be changed.

- iv. **Aquifer recharge with ground water is far more complex and will be far more costly than mitigation using surface water.**
- (1) Potential aquifer recharge methods include recharge from ponds, surface water spreading, infiltration recharge galleries (e.g., Utility Solutions), or injection wells.
 - (2) All these potential methods have serious technical limitations depending upon the given geologic setting.
 - (3) It will be necessary to conduct additional field investigations to determine if it is technically feasible to implement aquifer recharge using surface water.
 - (4) Relatively thick, low permeability geologic strata will often render the aquifer recharge methods as infeasible. Some geologic strata may not be permeable enough to receive recharge water at a rate to meet the project requirements. In this situation, the project would not be implementable.
 - (5) If aquifer recharge is deemed to be technically feasible, it will be necessary to conduct model simulations to satisfy the agency that the process will meet their requirements, and to meet potential objector concerns.
 - (6) Reinjection of recharge water via wells suffers both serious technical and regulatory limitations. Biofouling often arises in wells, etc.. It may be necessary to obtain an Underground Injection Permit from the U.S. Environmental Protection Agency. This process is arduous and takes several years.
 - (7) There are potential infrastructure constraints including:
 - (a) Presence of irrigation infrastructure (e.g., ditches and piping) is greatly helpful. Otherwise costs will escalate accordingly to construct such infrastructure.
 - (b) It may be necessary to construct new ditches or place piping to move the water to the location necessary. This will potentially require obtaining property easements, road easements, etc., for placing such infrastructure.

- (8) It may be necessary to use another property owner's land to accomplish the project objectives. Hence, it may be necessary to acquire land, or obtain easements, accordingly.
 - (9) The applicant may not have the surface water right to be used for aquifer recharge. It would be necessary to acquire a water right, if they are available, and if that right meets the constraint requirements to address the "affected reach."
 - (10) It will be necessary to demonstrate historic consumptive use.
- v. The added consulting fees for the above will vary depending upon the complexity. It is not unreasonable to assume that those additional costs associated with HB 831 at the low end will increase by \$ 10,000 for a simple project whereby it is acceptable to leave water in the stream (mitigation). If aquifer recharge is required, it is not unreasonable costs will increase a total of \$ 35,000 leading to a net consulting fee cost exceeding \$ 185,000. This latter cost assumes a relatively complex project that involves engineering design, ground-water modeling, surveying, and construction oversight.
- b. Mitigation or aquifer recharge will often be technically infeasible or non-implementable simply because the necessary surface water may not be available, particularly in areas where surface water irrigation had not been practiced historically. For instance, in the Big Sky area of Montana, historic irrigation has not been practiced at any substantive scale in the Gallatin River drainage. Hence, there is no meaningful option for mitigating the "affected reach" in that area. There are likely to be economic hardships for other geographic areas and economic sectors as well, including agriculture, development, real estate, etc. In addition, as discussed before, geologic constraints and physiological constraints may make aquifer recharge infeasible as well.
- c. If the project is implementable, the construction costs necessary will vary in accordance with geologic conditions, physical location, and the amount of infrastructure that must be constructed. It is not unreasonable to assume that the added construction costs would range from a minimum of \$ 50,000 to several hundred thousand dollars. Costs increases will be most dramatic if it necessary to pump/pipe the water to locations that do not currently have irrigation ditches or canals nearby.

- d. There will be long-term operation and maintenance (O&M) costs for projects that use aquifer recharge. The O&M costs are projected to range from a minimum of a few thousand dollars per year to tens of thousands of dollars per year, depending upon the scale of the project. These O&M costs will likely include energy costs for pumps to move water to the necessary location, equipment and infrastructure maintenance, metering costs, monitoring, etc..
9. In the event that it is required to treat waste-water to drinking-water standards per provision described on page 37, line 5 of LC 1383 (New Section 19, (3)a), another added cost will accrue being as low as \$ 250,000 to over \$ 1,000,000. There are some technical feasibility factors as well as the issue of treating waste water to drinking water standards is highly complex. For instance, my communications with treatment specialists indicate that treating waste water or even surface water to drinking water standards may not be either technically or economically feasible using current treatment technology. This all depends on the chemical analyte stream that is present.
10. In summary, the economic and technical feasibility of water supply projects would be affected significantly if mitigation/aquifer recharge is involved. The cost would be increased even more dramatically if it is necessary to treat water used for mitigation or aquifer recharge to drinking water standards per proposed Section 19 (3)a.
11. Table 2 and 3 summarize the anticipated costs. Note that actual capital expenditures and operation costs are not presented on those tables since these will be highly dependent upon the project setting. Therefore, an upper limit in costs for a program requiring aquifer recharge cannot be defined without knowing those site specific conditions. Total costs near and even exceeding \$1,000,000 would not be unreasonable to assume for a large, complex project. In the event that high level treatment of waste water is required, and in the event it is technically feasible, then costs may be nearer or in exceedance of \$2,000,000.

Table 1

**Representative Cost Summary - Non-Contested
Existing Program No Mitigation/No Aquifer Recharge**

Cost to Complete Application - Correct and Complete

Small Subdivision or Small Irrigation Well - Geology Not Complex

Consulting Fees \$20,000

Driller Fees \$22,500

Permit Application \$600

====> \$43,100

Large Subdivision and/or Deep Wells in Complex Geology

Consulting Fees \$50,000

Driller Fees \$200,000

Permit Application \$600

====> \$250,600

Representative Cost Range	from	\$43,100	to	\$250,600
	<i>Round off to</i>	\$43,000	<i>to</i>	\$250,000

***Does not include legal assistance fees.
Does not include other infrastructure costs.***

Table 2

**Representative Cost Summary
Mitigation or Aquifer Recharge Per HB 831 - Non-contested Application ***

Example 1: Small Subdivision or Small Irrigation Well - Geology Not Complex Water left in stream using existing beneficial use permit (mitigation).
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Consulting Fees	\$20,000
Added Cost Associated with Requirements per HB 831	\$10,000
Driller Fees	\$22,500
Permit Application	\$400

Minimum	====>	\$52,900
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Example 2: Large Subdivision, Public Utility and/or Deep Wells in Complex Geology Water placed in a target aquifer via aquifer recharge (if technically feasible)
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Consulting, Engineering Design, Construction Oversight	\$150,000
Added Consulting Fees Assoc. with Requirements per HB 831	\$35,000
Capital Equipment Costs	**
Construction Costs	**
Present Value - Operation and Maintenance Costs (O&M)	**
Driller Fees	\$200,000
Permit Application	\$400

	====>	\$385,400
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Representative Cost Range	from	\$52,900	to	\$385,400
	Round off to	\$53,000	to	\$385,000

(not including capital equipment, construction and O&M costs for aquifer recharge)

* Consulting and legal fees will increase accordingly if a contested hearing evolves. Contested hearings are common-place in basin closure areas.

** Capital, construction and O&M costs are indeterminate and would be based upon site conditions. Capital needed would include equipment such as:

- 1 Pumps
- 2 Pipeline(s)
- 3 Infiltration galleries
- 4 Metering instrumentation
- 5 Etc.

Table 3

**Representative Cost Summary - Non-contested
Aquifer Recharge Includes Wastewater Treatment - Per HB 831**

Example 3: Large Subdivision, Public Utility and/or Deep Wells in Complex Geology Water and wastewater placed in a target aquifer via aquifer recharge.
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Consulting, Engineering Design, Construction Oversight *				\$150,000
Added Consulting Cost Associated with Requirements per HB 831				\$75,000
<i>Capital Equipment Costs</i>				**
<i>Construction Costs</i>				**
<i>Present Value - Operation and Maintenance Costs (O&M)</i>				**
Driller Fees				\$200,000
Net Increase in cost for wastewater treatment plant to meet drinking water standards***	from	\$250,000	to	\$1,000,000
Permit Application				\$400
			====>	\$1,425,400
Representative Cost Range	from	\$600,400	to	\$1,425,400
	Round off to	\$600,000	to	\$1,425,000

(not including capital equipment, construction and O&M costs for aquifer recharge system)

* Consulting fees will increase substantially if advanced wastewater treatment is required. The costs also address the additional reporting requirements. Contested hearings are common-place in basin closure areas and the costs will increase substantially over what is shown for a contested hearing.

** Capital, construction and O&M costs are indeterminate and would be based upon site conditions. Capital needed would include equipment such as:

- 1 Pumps
- 2 Pipeline(s)
- 3 Infiltration galleries
- 4 Metering instrumentation
- 5 Etc.

*** Net increase in cost to treat wastewater to drinking-water standards per provision described on page 37, line 5 of LC 1383 (New Section 19, (3)a).

Schedules For Obtaining Beneficial Use Permit - Ground Water - Non-contested Current Program									
	2	6	2	2	16	5	Total Weeks		
Planning									
Investigation and Testing									
Data Assessment									
Report									
Agency Review/Interaction									
Public Notice									33

Schedules For Obtaining Beneficial Use Permit - Ground Water - Non-contested Proposed Program HB 831 - No Mitigation/No Recharge Required									
	2	6	2	1	2	16	12	5	Total Weeks
Planning									
Investigation and Testing									
Data Assessment									
Groundwater Model - Analytical *									
Report									
Agency Review/Interaction									
MBMG Review									
Public Notice									46

* Note that time will be greater if a numerical model, such as MODFLOW, is used.

Schedules For Obtaining Beneficial Use Permit - Ground Water - Non-Contested Proposed Program HB 831 Public Water Supply - Aquifer Recharge Required									
	2	6	4	3	4	16	12	5	Total Weeks
Planning									
Application with MDEQ									
Investigation and Testing									
Data Assessment									
Numerical Model									
Agency Review/Interaction									
MBMG Review									
Public Notice									52

Schedules For Obtaining Beneficial Use Permit - Ground Water Contested Proposed Program HB 831 Public Water Supply - Aquifer Recharge Required											
	2	6	4	3	4	16	12	5	26	16	Total Weeks
Planning											
Application with MDEQ											
Investigation and Testing											
Data Assessment											
Numerical Model											
Agency Review/Interaction											
MBMG Review											
Public Notice											
Hearing (Scheduling and hearing)											
Draft and Final Order											94

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Representative Schedules - HB 384, 831
 Completing Permitting Process for Beneficial Use Permit
 Ground Water

Figure 1